

REMARKS

By the foregoing amendments corrections have been made on several pages of the specification. Claims 1-28 have been cancelled subject to Applicant's right to file a Divisional Application to the non-elected inventions as set forth in the Restriction Requirement in the Office Action of December 29, 3005. New claims 29-42 have been added. Thus, new claims 29-42 are in the application.

Figs. 1 and 2A-2C were objected to in the Office Action and required to be designated as Prior Art. Responsive to this requirement by the above amendments drawing Figs. 1 and 2A-2C have been designated as "PRIOR ART" in the attached drawing Replacement Sheet containing these figures.

The disclosure was objected to in the Office Action because of informalities, particularly those on page 22, lines 21 and 22, as referred to on pages 2 and 3 of the Office Action. Responsive to the objection, by the above amendments the specification has been amended to correct the reference numerals on page 22 and to correct other minor errors in the specification.

Claims 1-15 were rejected in the Office Action under 35 U.S.C. §102(b) as being anticipated by the Patent to Gitis et al, U.S. Patent No. 6,494,765, as set forth on pages 3-6 of the Office Action. While this rejection has been rendered moot by the cancellation of claims 1-15, Applicants respectfully submit that new claims 29-42 patentably define over the reference to Gitis et al.

The Patent to Gitis et al is directed to a method and apparatus for controlled polishing. In pertinent part, according to Fig. 10 of Gitis et al, rotational shaft 78 supports the object (wafer) to be treated. Shaft 78 is rotatably driven by a drive 82.

Drive 82 together with shaft 78 and intermittent rotating unit 76 are linearly moved perpendicularly to the rotational axis x, by means of a drive mechanism 66. Vertical movement of the arrangement with shaft 78 is performed by vertical movement cross-bar 58. This assembly cooperates with a large polishing table rotatably mounted on a further drive shaft 106 cooperating with the drive motor 102.

A first sensor arrangement 84, which is upstream of the rotary drive 82/76, senses friction force, compression force as well as friction torque. The skilled artisan is somehow confused about friction torque sensing upstream the rotary drive.

A second sensor assembly 86 is applied between shaft 78 and holding chuck 72. These two first and second sensor assemblies 84 and 86 are conceived as shown in Fig. 12.

There is further provided a third sensor assembly 108 upstream a transmission 104 for the large table 72 and fourth sensor assembly 110 upstream such transmission 104. Only these two sensor assemblies 110 and 108 are conceived as shown in Fig. 13. It is explicitly mentioned in column 11 of the patent that the first and second force sensor are conceived as shown in Fig. 12 and the third and fourth sensor according to Fig. 13.

As Gitis et al clearly addresses with respect to the first as well as the second sensor assemblies 84 and 86 also torque measurement, it is astonishing, why he exclusively addresses to provide a torque sensor assembly as shown in Fig. 13 only for the third and fourth sensor assemblies 110 and 108. There is apparently a principal difference between requirements for sensor assemblies 84, 86 on one hand and sensor assemblies 110, 108 on the other hand.

The skilled artisan clearly recognizes that the large turntable 94, 92 may be and will be construed so that loading parallel to rotational axis y is supported independently from torque loading. This may e.g. be done by providing between the stationary base plate 54 and plate 92 a ball bearing along the periphery of plate 92 (see enclosed sketch). No reasonable construction of such a large and heavy turntable 92 would for hi-precision rotating, bear the whole plate exclusively on axle shaft 106.

Thus, if the compressing force and weight is supported at a different locus than shaft 106, then force sensor assembly 110 will exclusively be loaded by torque transmission without any loading in direction of the axis y (see sketch). It is quite obvious that in such case there will be no problem of providing a thin-walled cylinder 146 as of Fig. 13 in Gitis et al for accurate torque measurement as such cylinder will not be loaded by compressive forces.

Therefrom, it becomes clear to the skilled artisan why the two sensor assemblies, and especially the second one, 86, are conceived as shown in Fig. 12 which may withstand high compressive forces and is not yet conceived equally to the torque sensor as shown in Fig. 13. This is a principal difference to the present invention, namely, that the arrangement of the torque sensor of Fig. 13 of Gitis et al is not used along a rotational driving shaft which is loaded with the polishing pressing force. Further, and according to Gitis et al, there is provided within the cross-bar 58, which is exclusively vertically movable and not along a horizontal plane, i.e. perpendicularly to the rotary axes x and y, a transducing unit 152 which acquires output data signals from the first force sensor, a friction transducing unit 154 which, on the other hand acquires output data signals from the second force sensor and

from the torque sensor. Thus, the electronics 152 and 154 is mounted on a system part which is just movable up and down, so that there result in fact no problems at all to transmit the electrical output signal from such up and down movable electronics to the stationary valuation control system 156. Gitis et al is completely silent about how the electric output signals of the sensors at the arrangement according to Fig. 13 and applied at 110 and 108 of Fig. 10 are evaluated and transmitted from rotary part to a stationary control unit as of 156.

The new independent claims 29 and 30 and the dependent claims 31-42 presented herein recite respective ones of the aforementioned distinguishing features of the invention so as to patentably define over the cited reference. Accordingly, reconsideration and allowance of new claims 29-42 is requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (635.43617X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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Attachments

RJS:dlh